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Enablers and Barriers to the Organizational Adoption of Sustainable Business Practices

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ABSTRACT

Individuals, organizations, and governments are increasingly becoming aware of the necessity of sustainability in living, organizing, performing, and managing work. In this context, "green IS" has become an established colloquial term, acknowledging that information technology, corporate information systems, and the surrounding practices are both a contributor to the sustainability challenge and a potential enabler for green and sustainable practices. To date, however, there are few reported studies on the role of information systems for the challenge, and solution, of sustainability. This paper presents results from a case study of a world-wide operating IT software solution provider that is engaged in the development and adoption of sustainable practices. Our study suggests that the adoption of sustainable practices comes along with a number of particularities. We found information technology to be a key enabler of transparency about the progress of sustainability operations. We further found personal, motivator factors as well as organizational factors such as business inclusion, strategy definition, and a dialectic top-management and bottom-up support, to play a role in enabling a company to manage their sustainability. We describe a set of conjectures forthcoming from our case analysis, and detail some implications for further research in this area.

Keywords

Green IS, Sustainable Practices, Organizational Adoption, Case Research

INTRODUCTION

The ever-increasing world-wide population, the demand for living standards, and the ongoing exploitation of natural resources have increased a wider awareness for the necessity of sustainability in living, organizing, performing, and managing work. Sustainable practices are more than ever on the radar screen of organizations, triggered by a growing demand of the wider population towards approaches and practices that can be considered "green," "sustainable," and also "social." In consequence, organizations are increasingly motivated to implement sustainable practices while still adhering to classical business imperatives such as revenues or costs.

"Green IS" is an established colloquial term nowadays that acknowledges Information Technology (IT), Information Systems (IS), and the surrounding practices as a contributor to environmental problems as well as a potential enabler of green, sustainable solutions to this challenge. Yet, while organizations around the globe increasingly realize the demand and potential of the transformative power of IS to design, shape, or support sustainable practices (Watson et al. 2008), to date, few examples of such approaches actually exist in industry or are reported in studies.

In academia, green IS and green IT are current hot topics, reflected in a number of upcoming journal special issues (e.g., Australasian Journal of Information Systems, MIS Quarterly) and the development of dedicated conference tracks at some of our conferences (e.g., AMCIS, ACIS). Yet, to date, aside from selected viewpoints and research agendas on this topic (e.g., Melville 2010), few examples of empirical studies of sustainability in IS practice exist (Watson et al. 2010). Consequently, sustainable practices in business environments, and the role that green IT and green IS play in the development of such practices, warrant further investigation. We believe specifically that there is a need for studies that examine how sustainable practices can be adopted within an organization to enable, support, or achieve long-term sustainability. Such research could inform an important body of knowledge to guide other organizations in their endeavors of realizing the societal, environmental or even strategic potential of sustainability (Porter and Kramer 2006).

In this paper, therefore, we describe research we undertook to study, specifically, important barriers and enablers for the effective adoption of sustainable business practices. We report on a case study of a globally operating IT software solution provider that is at current engaging in a project to develop and implement dedicated sustainability operations. Our study was motivated by the following two research questions:

RQ1: *What are enablers and barriers to the adoption of sustainable business practices?*

RQ2: *What is the role of IS in the development and adoption of sustainable practices?*

The remainder of this paper proceeds as follows; first, we review the current conceptions of sustainability in business practices by examining prior research about how advanced IT or green IS can contribute to sustainable business processes. Next, we discuss design and findings of our case study in which we explore how sustainability operations are being implemented at a large IT software solution provider. We discuss the findings from this case and suggest an initial model of enablers and barriers to the adoption of sustainable business practices. We conclude this paper with a number of speculations about the implications of our research.

RELATED WORK

Arguably, sustainability is a hot topic on the radar screen of many business and information chief executives. This is because business enterprises are a dominant form of social organization and contribute to the worsening, and enhancement of the natural environment, which, most would argue, is under imminent pressure (Melville 2010). In light of this challenge, IS leaders took heed, and recently singled out "green IT" as a most important strategic technology (Pettey 2007). On the basis of such technology, Watson et al. (2008) argue that green IS can contribute to sustainable business processes, for instance, by:

- reducing logistics costs through fleet, delivery, or vehicle routing management systems that minimize traffic congestion and energy consumption,
- facilitating virtual collaboration between distributed teams, thereby reducing the impact of travel,
- supporting remote working through systems that enable virtual collaboration, group document management, cooperative knowledge management, and so forth,
- monitor and analyze environmental information (such as toxicity, energy used, water used, carbon emissions etc.) produced in business processes, and assisting the management of a firm's operational emissions and waste products, and
- provide information to end users and consumers to facilitate decision-making under consideration of "green" choices.

These suggestions highlight a potential central role of IS to sustainable business practice, because of the role it plays in understanding and re-redesigning organizational processes. Yet, while world opinion, corporations, and IS units appear to acknowledge and be aware of the problem, aside from panel reports (Avital et al. 2007) and opinions (Melville 2010; Watson et al. 2010), it would appear that the IS academic community has been relatively slow in addressing the challenge of sustainability in business practices, and the role of IS to that challenge.

To understand the current body of knowledge, we searched all articles published from 1999-2009 in the six journals listed by the Association for Information Systems (AIS) as "top journals" in the IS field (*European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of the Association for Information Systems*, *Journal of Management Information Systems*, and *MIS Quarterly*). We contend that some other journals may also publish related research, yet, we argue that our journal sample provides a useful snapshot of the research that has been published in this area recently.

In the selected time frame, 2,002 articles were published in this sample of journals. Of these articles, we identified eleven candidate articles that focus on sustainability in IS. We identified those papers through a full-text search for the keywords "sustainability", "green" and "ecological", and carefully inspecting each result returned by the search engine. We eliminated papers that used the search terms for concepts irrelevant to this research (e.g., the term "green" returned a large number of papers co-authored by scholars named Green, and "ecological" often referred to ecological validity or ecological environments). As will be explained in the following, the analysis of the related literature in particular shows that the notion of sustainability is used in a twofold manner.

First, it becomes apparent that among those studies that were deemed relevant to the present study, in most cases the term sustainability is used to conceptualize a temporal, long-term impact (or long-term use) of different IT-related initiatives or artifacts. In this line of thought, Braa et al. (2004), in their study of sustainable health IS across developing countries, frame sustainability as "the challenge to make an information system work, in practice, over time, in a local setting" (p. 338). They

discuss the sustainability of action research efforts and argue that "local action research interventions need to be conceptualized and approached as but one element in a larger network of action in order to ensure sustainability" (p. 337). This temporal aspect of sustainability also becomes apparent in Ribes and Finholt (2009), who discuss the dialectic of short term versus long term goals in the context of long-term sustainability of e-infrastructures. They elaborate on the notion of the "long now" as a conceptualization of a temporal view of sustainability that needs to be prevalent in present-time considerations. They identify nine tensions that reflect the difficulties of long-term design that are organized around three concerns (motivating contributions, aligning end goals, designing for use) and three scales of infrastructure (institutionalizing, organizing work, enacting technology). Butler (2001) examines the factors that impact the sustainability of social network structures and provides a resource-based theory considering member attraction retention, resource availability, and benefit creation process. Madon (2005) identifies critical issues impacting on the sustainability of a telecenter project; therein, sustainability is identified as the pivot of the long-term survival of telecenters. A very basic use of the notion of sustainability can be found in Mursu et al. (2003), who frame the 'basic' sustainability of IS through the question of whether IT is used appropriately (p. 190).

Second, there are some articles where sustainability is discussed in relationship to more social and ecological aspects rather than the mere long-term use of some IT artifact. Torkzadeh and Dhillon (2002), for example, identify internet ecology as a fundamental objective of internet commerce. They use three items to measure the factors, which are related to the minimization of pollution and environmental impact, as well as the reduction of environmental damages. Mbarika et al. (2005) discuss a research agenda for Sub-Saharan Africa, one of the world's least developed regions. They argue that such regions can gain much from the use of ICT in terms of socio-economic development. They write about topics including infrastructure, technologies, ICT development, ICT application, telemedicine, online education, and electronic commerce as well as their potential to contribute to the socio-economic development in Sub-Sahara Africa. Olphert and Damodaran (2007) discuss a socio-technical, participatory approach to e-Government development and mention sustainability as an outcome of a citizen participation/engagement projects. Grimsley and Meehan (2007), with regard to e-Government systems, write that these differ from commercial IS in that "they frequently encompass strategic goals that go beyond efficiency, effectiveness and economy, and include political and social objectives such as trust in government, social inclusion, community regeneration, community well-being and sustainability" (p. 134). At this, environmental and economic sustainability are framed as a generic service-related outcome. Cecez-Kecmanovic et al. (2008) identify three core concerns for critical IS research, one of which is "the role of IS in enabling and maintaining the economic–rationalist view of organizations that prioritizes the interests of stockholders and managers over those of society as a whole (e.g. infinite growth in a finite world with obvious ecological consequences) and all other stakeholders, i.e. employees, community groups, society, environment, etc." (p. 125) – an issue that should motivate IS researchers to engage into further research on a topic that is of undisputable relevance to society.

In summary, the literature analysis has shown that the notion of sustainability is not entirely new to the IS discipline; however, the use of sustainable practices, and the role of IS therein, has not been discussed in much depth.

RESEARCH METHOD

Research Approach

Because the domain of sustainable business practices is theory bereft and largely unexplored (Melville 2010), we selected a revelatory case study as an appropriate research method (Dubé and Paré 2003). A case study approach was deemed adequate as it would allow us to study sustainable practices, and their implementation, as a broad and complex phenomenon tightly coupled within the socio-organizational context in which it occurs (Eisenhardt 1989). The choice of a single revelatory case study is justified because access to the case site presented us with an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation (Yin 2003).

Case Setting and Context

The case organization is a leading IT software solution provider that operates worldwide. The organization employs about 45,000 people and has its main areas of business in the field of ERP software; i.e., software supporting organizational processes including accounting, procurement, retail, and human resource management. The case organization has implemented a company-wide sustainability program. The sustainability-related transformation is considered as one of the biggest change efforts in the organization, reaching and involving more employees than any other transformation initiative. Today the organization takes a leading role in sustainability, which is also reflected by top-rankings in global sustainability indexes. Thus, a site was selected, where the phenomenon of interest could be easily observed (Eisenhardt 1989).

Data Collection and Analysis

Our study used two main methods of data collection. First, relevant documents were analyzed, including the organization-internal sustainability report condensing targets, progress, and challenges of the project to date. Second, four members of the organization's sustainability operations team participated in semi-structured interviews with the purpose of addressing aspects related to the organization's internal sustainability transformation initiative. We discuss the design of these interviews next.

Interview Design

We conducted semi-structured, topical interviews with the managers being responsible for the organization's sustainability operations. The interviews were designed based on a set of pre-planned questions to cover the subject area (Rubin and Rubin 1995).

In designing the interview protocol, we took inspiration from the debate between Carr (2003) and Smith and Fingar (2003) about whether (1) IT or (2) business processes matter to (3) organizational value. With our interest being in sustainable practices, and with the realization that IS concern how IT enables organizations to change and support business processes (Melville 2010), we decided to develop three key question areas, adopting the three key areas from the Carr-Smith/Fingar debate, to be able to study whether (1) IT or (2) processes, or both, matter to the enablement of (3) sustainability:

(1) **Sustainability**: What is it, why is it important, how can it be measured and what are important impact factors?

(2) **IT**: what is "green IT", where is the value, what is the demand and what is the supply?

(3) **Processes**: what are "green processes", what is the role of IT in green processes, how can green processes create value?

Using these key questions as a rough structure, we allowed in the interviews for further follow-up inquiries in order to gain a deeper understanding of the subject matter or to clarify an individual response. Overall, the interview length was between 60 and 90 minutes each. Interviews were conducted in October 2009. Table 1 provides an overview.

Table 1: Summary of Interview Data Collected

Respondent	Position	Gender	Date and duration of interview
Respondent A	Head of Sustainability Operations	Male	28-10-2009, 1h06min
Respondent B	Head of Economic Sustainability	Female	28-10-2009, 1h11min
Respondent C	Head of Social Sustainability	Male	30-10-2009, 1h19min
Respondent D	Head of Ecological Sustainability	Male	26-10-2009, 1h30min

Interview Analysis

All interviews were audio-recorded and transcribed. We used the qualitative data analysis tool NViVo (www.qsrinternational.com) for data analysis, using methodological guidelines (Bandara 2006) where available. Three researchers were involved in the coding to mitigate potential subjectivity bias in the analysis, and to allow for triangulation, viz., multiple perspectives allowed achieving a strong substantiation of emerging concepts (Eisenhardt 1989; Pettigrew 1990).

Interviews were coded starting with some pre-defined general categories, or themes, (Coffey and Atkinson 1996), namely *organizational drivers*, *goals and strategies*, *challenges*, and *success factors*. We used these generic categories, predominantly, to understand high-level motives, approaches, and results as experienced by the case organizations. The choice of these high-level categories was particularly guided by our underlying research questions.

While we started with this set of high-level categories, we were well-aware that our coding exercise may result in a refinement of the categories. Indeed, it is typical for qualitative research to start with some general categories but to stay aware for more specific, fine-grained themes that may lead to the formation of other categories at the same time (Bazeley 2007). And indeed, through the data analysis, we revised the above categories into a set of new high-level categories that we labeled **strategy definition**, **organizational support**, **motivation**, and **traceability**. In the following we provide a detailed account of each of the categories we identified. In so doing we provide exemplary evidence from the case study conducted.

FINDINGS

Two sides of the same coin

During our data analysis, we realized that two perspectives on sustainability were prevalent in the case organization, and need to be taken into account when examining their implementation of sustainability operations. First, on the surface, the case organization aims at providing to their customers **IT solutions for sustainability**. Second, deep within, the organization strives to develop **internal sustainable practices**. Within this dialectic, it became apparent that there is a close relationship between the two areas, in that internal sustainability is seen as a pre-requisite credibility factor for the provision of IT solutions. Furthermore, the internal perspective on sustainable practices within the organization was seen as a fundamental task for a responsible organization, with the added economic benefit of being able to emerge as a provider of sustainability solutions to the outside. Consider the following statement from *Respondent B*:

> *But in order to have the license to do that [provide sustainable software solution], our team is needed […] because we can only sell the products as a credible supplier if we do what we preach. We call it walk the talk, that we must do that and we are also kind of co-innovation partners when it comes to product development.*

In the reported case, our data suggests that the goal of providing a sustainable solution must be seen not only from relevant **environmental** and **social** perspectives, but also should not be separated from an **economic** perspective; i.e., the business opportunity of becoming a sustainable organization. This finding suggests that, in order to be able to provide solutions impacting sustainability in a societal and environmental context, achieving internal sustainability is a vital prerequisite for lending credibility to the offered solutions. This interdependency lends support to the importance of an economic perspective – which details the organizational motive for developing sustainable IS practices in order to be credible as a provider of sustainable solutions to the wider clientele. This economic perspective, however, does not dominate environmental or social responsibility considerations but rather emerges as an additional, complementary organizational incentive to engage in sustainability transformations.

This finding is in line with the arguments offered by Watson et al. (2008) who speculate opportunities of sustainable practices for enhancing profitability and opening new strategic directions for a firm. Our case reveals that, in order to so, sustainable development also needs to address the management of internal business practices so as to lend support to the establishment of the organization as a sustainability provider.

In the following, we provide the findings related to the role of internal sustainable practices specifically. In doing so, we provide answers to the research questions by discussing enablers for the adoption of sustainable practices with a particular focus on the role of IS in the case organization.

Enablers and barriers to the successful adoption of sustainable practices

We identified from our interview data analysis four major categories of enablers, namely **strategy definition**, **organizational support**, **motivation**, and **traceability**. While some of these factors (organizational support and strategy definition) display relevance also to other types of organizational change efforts such as ERP implementation (Fui-Hoon Nah et al. 2003) or process outsourcing (Ravi et al. 2005), we uncovered a number of particularities attributed to the specific subject of sustainability. We discuss the factors in the following.

Strategy Definition

There was clear evidence for the relevance of defining a strategy, and clear strategic targets. *Respondent A* stated:

> *Coming up with a clear strategy and that strategy embedded in the overall [corporate] strategy. I think that is the biggest positive factor, driver that we have achieved.*

Respondent D noted:

> *So that's, we defined the target, we received the buy-in from head of global facility management. And then I would say the success story was we really were evaluating the potential. We were defining the target and then the responsibility was in the line of business, they did a really great job of integrating that in their organizations.*

In terms of sustainability, it was found that a clear target definition was a remarkable advancement in the case organization, as it changed the set of corporate strategic measures, which formerly were primarily focused on mere economic metrics, towards inclusion of values associated with economic and social responsibilities. Thus, introducing measures for environmental and social issues, particularly during a time of economical crisis, showed great top management support to this topic. We will look into this aspect in more detail in the following, referring to the organizational support.

Organizational Support

With regard to **organizational support,** our findings suggest that the main enablers for successful adoption of sustainable practices were *top management support, inclusion across all lines of business,* and *bottom-up support*. With regard to top management support, having the commitment from two chief executives – CEO and COO – ensured both strategic commitment and support for making changes in the day-to-day operations also. *Respondent C* noted:

> *Well I think it...what we did particularly well is the engagement of the senior leadership team. I mean this topic is extremely high on the agenda of our CEO and the COO and our head of development so this has been done very effectively. Otherwise they hadn't committed the resources for a long term strategic project like that. So involvement of senior management I think worked very well.*

In addition to this, it was tried to build a lean sustainability organization and to include *all lines of business* by sharing responsibilities across all involved business units. An example for this is provided by *Respondent D* above who noted the explicit definition of target metrics for various lines of business, and the necessity of integrating the different lines of business to achieving the new corporate targets.

Similar to the interplay between sustainability as a product and sustainability as an internal process, we noted a dialectic role of organizational support. Whilst top management support was important to define targets and drive long-term commitment, at the same time, there is clear evidence from all respondents, that bottom-up support was equally important. The following statement made by *Respondent B* exemplifies this:

> *We feel that we cannot change the company and make the company sustainable unless employees feel that they kind of want to contribute to that because we can decide what we want, if employees still decide to, I don't know, drive two hundred kilometers per day by car or always switch on the lights or leave their computer on during nights...we cannot reach our targets. So it's really to, yeah, target employees and that's where the champions help.*

This finding underlines the key importance of individual commitments to social and environmental responsibility as an enabler of bottom-up organizational support for a sustainability program. This indicates that companies require employees as "good citizens" that address sustainability issues that may not even be a direct result of their operations, but still mitigate the negative impacts as a direct or collateral effect of day-to-day business activities.

In our study, we further found a close relationship between wide-ranging bottom-up support and the concept of intrinsic motivation. As employees feel "emotionally attached," it was relatively easy to find people to engage in the sustainability program, and to achieve the bottom-up support required to implement sustainability in day-to-day operations. The following comment from *Respondent A* exemplifies this:

> *There is a lot of grass root activities and already in the past before we considered to underpin our long term commitment to sustainability, and it would be stupid not to use that. You know, there's a lot of energy, there's a lot of expectation, there are a lot of positive activities already going on for many years from employees, triggered by them, and to use that energy in a positive sense.*

This positive energy towards the topic of sustainability leads us to the next, very specific, enabler for introducing sustainability practices, namely the motivation of people to commit to social and environmental responsibilities. Indeed, we believe that individual motivation emerges as a key enabler for sustainability programs, over and above the role of motivation to other business transformation topics.

Motivation

Typically, both **extrinsic and intrinsic motivational factors** play a role in adopting a new technology or business practice (e.g., Davis et al. 1992). Our study suggests that intrinsic motivation specifically is something that is particular to the sustainability topic. The following statement made by *Respondent A* exemplifies this:

> *With sustainability we really had the opportunity […] to connect that to the heart as well doing something. Not only good for customers or clients but we were doing something good for society, for our planet.*

Intrinsic motivation to act environmentally and socially responsible was identified, and addressed, as an important personal incentive factor to achieve bottom-up support throughout the case organization. Still, while intrinsic motivation appeared to be an important enabler in order to permeate the organization, we also found extrinsic motivational factors to be important, specifically as in the case organization sustainability-related efforts impacted on target agreements. Our data suggests that setting appropriate incentive systems that embody relevant target agreements are relevant to successfully adopting sustainable practices. This includes clear accountabilities and responsibilities of involved people. *Respondent D,* for example, stated:

> *The reason why it worked well is because they really felt accountable for that. There we used economic incentives if you want because then carbon or this reduction target of electricity consumption […] was part of their personal targets, was part of the company targets.*

Traceability

Aside from the organizational and individual factors, our case analysis further revealed that **traceability** – in the sense of *transparency* and *measurement* – are highly relevant factors for the adoption of sustainable practices. Our study suggests specifically that IT plays a paramount role in this context; the measurement of important sustainability targets, such as the reduction of carbon emissions, requires the collection and analysis of huge amounts of data. *Respondent B* made the following statement:

> *I think that transparency is one of the most important things when it comes to sustainability. Because without that you cannot see where you're good, where you're bad, where can you set targets, how have you improved. There is this saying, like you can only manage what you measure.*

The role of IT was also deemed important to trace the huge amount of data by *Respondent A*:

> *The role of the information technology is that it helps you in a standardized way in a process oriented way to have the holistic view but as well then the deep dive opportunity. Without IT I would say it would struggle with hundreds of parameters with differences from global perspectives and the different countries. So I think without systems support, IT support you would be a big, big challenge to manage sustainability.*

This finding suggests that the role of "green IT" can specifically be to facilitate:

- the monitoring of target sustainability measures and their fulfillment by various lines of business,
- the streamlining of business processes in adherence to a global, standardized sustainable practice paradigm, and
- the collection, analysis, and provision of sustainability-relevant information (such as carbon footprints, paper waste, energy, and water use) produced in business processes, to enable benchmarking against key strategic goals.

DISCUSSION

To develop a cohesive view of the sustainability phenomenon observed at the case organization, we sought to characterize the findings observed in a way that would allow us to integrate the identified factors in a comprehensive conceptual model. Such a model is hoped to sensitize fellow researchers (Klein and Myers 1999) and may also help to proceed to a more general model beyond the substantive area that was studied and, thus, contribute to the development of theory on the adoption of sustainable practices.

The study suggests that, for the case organization, sustainability is a two-fold endeavor. First, the organization strives to develop internal capabilities to become economically, ecologically, and socially sustainable. Second, the organization aims at providing IT solutions for sustainability to their customers. Social and ecological sustainability thus should be seen from a responsibility as well as an economic perspective. While the case organization's efforts are urged by internal demands and guided by ethical motives, there is also a need to become internally sustainable in order to be acknowledged as a credible provider of sustainable solutions; i.e., to leverage an emergent business opportunity.

Against this background, Figure 1 focuses on the internal perspective and provides an initial model of organizational adoption of sustainable IT practices by integrating the above introduced concepts. As such, the model shows *enablers* to the adoption of sustainable IT practices; *barriers*, in turn, are marked by a lack of the same. The successful adoption of sustainable practices has two dimensions, namely internal acceptance and target accomplishment. The study suggests, for example, that a lack of support from middle management (organizational) support, as well as a lack of transparency negatively impact on the adoption of sustainable IT practices.

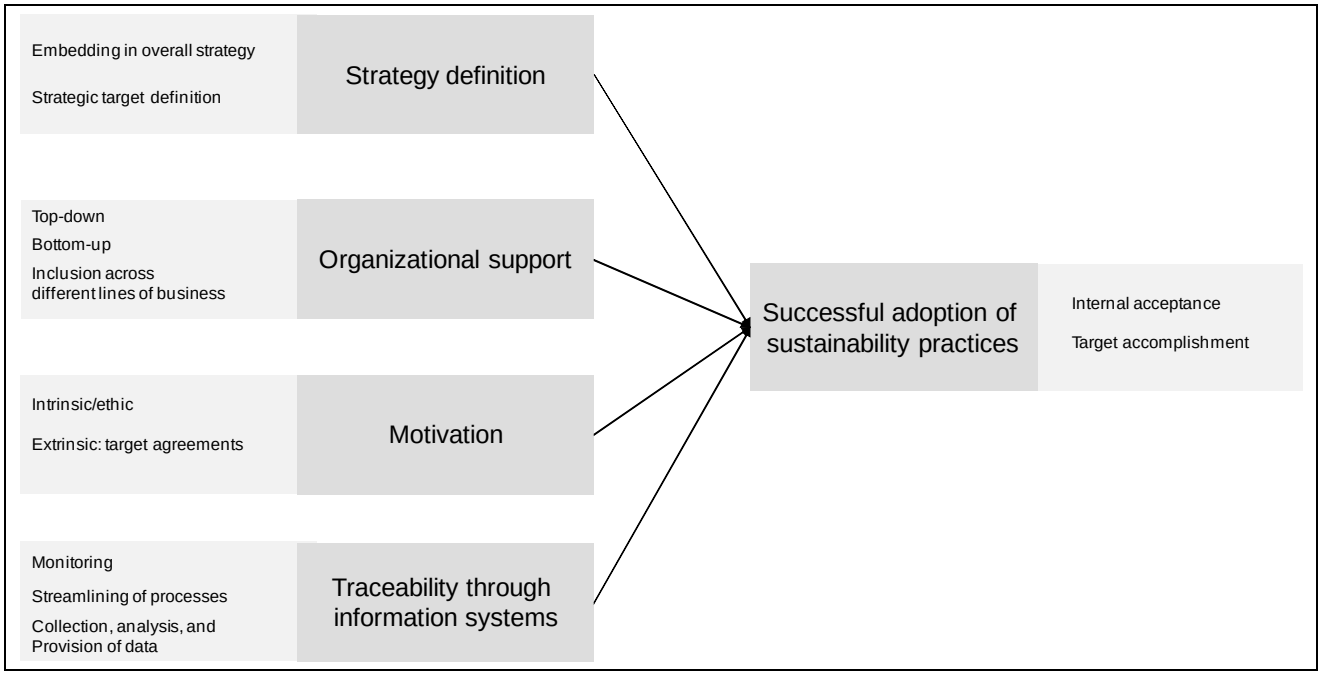

Figure 1. Conceptualization of the enablers and barriers to the adoption of sustainable IS practices

The evidence in our case study provides some support for the suggested initial conceptualization of the adoption of sustainable business practices. Grounded in our analysis of the data, the conceptual model in Figure 1 suggests the following conjectures, which, of course, could not be fully answered through the revelatory case conducted. Still, we believe, based on our initial evidence, that these conjectures merit future empirical study:

> ***Conjecture 1****: The successful adoption of sustainable practices can be supported by clearly envisioned strategic targets that are incorporated into the organization's overall strategy.*
>
> ***Conjecture 2:*** *The successful adoption of sustainable practices can be supported by the provision of holistic, but lean organizational support across all hierarchical levels and functional areas.*
>
> ***Conjecture 3:*** *The adoption of sustainable practices is positively influenced by high levels of intrinsic motivation of involved employees.*
>
> ***Conjecture 4:*** *The adoption of sustainable practices requires transparency related to targets and measures; the big amount of data requires IT enablement.*

The first four conjectures thus relate to the initial model of enablers and barriers to the adoption of sustainable IS practices. At a more general level, the study suggests that organizations need to consider sustainability as a holistic phenomenon requiring the balancing of at least three major dimensions:

> ***Conjecture 5:*** *The successful adoption of sustainable practices requires organizations to consider social and ecological responsibilities as well as economic opportunities in a balanced way.*

CONCLUSIONS

Contributions

This research contributes to the emerging research body on the development and implementation of sustainable business practices by examining the case of an IT software solution provider. By proposing an initial framework to understand the enablers and barriers to the adoption of sustainability practices, we developed a set of conjectures to provide fellow researchers with a set of propositions that may guide further research. We believe that this research is also of high relevance to industry practice by showcasing the process, enablers, and barriers encountered by the case organization in adopting sustainable IS practices. These experiences may guide fellow organizations in their endeavors towards sustainable practices.

Limitations

This research has some limitations. First, it presents the findings from a single revelatory case study. Thus, the findings apply to the substantive area that was studied; as a consequence more empirical research is necessary in order to further the scope and generalizability of the proposed model (Urquhart et al. 2010). Second, we are aware that other researchers may have come up with a different conceptualization. In order to mitigate this limitation and the potential bias underlying our data analysis, we employed a technique called triangulation by involving multiple researchers in the process of analyzing the data (similar to Orlikowski 1993). We do not claim that the categories and relationships proposed in the present study are exhaustive but rather that they present an initial body of knowledge about a relevant and emergent aspect of IS – the creation and adoption of sustainable practices. Third, we acknowledge the scope of our literature review as a potential limitations. In particular, there has been research on Green IT, and specifically, the influence of institutional forces on the adoption of sustainble business practices, which we didn't consider in our study to date.

Future research

Because our research is based on one case study, we will proceed to collect additional data from additional companies, as well as over time. This will allow us to confirm and extend our initial model, and to yield more generalizable results.

We further propose two main avenues for future research. First, we encourage fellow researchers to conduct further empirical studies on the adoption of sustainable practices in order to proceed to more formal theoretical models. We have attempted to provide an initial model of how practices are adapted to reflect environmental, economic, and societal sustainability issues, on the basis of which future research can enhance our understanding of how sustainable practices form, diffuse, or impact organizations and the wider society. Specifically, we will attempt to investigate in more details how IS, or advanced "green IS" contribute to the development and implementation of sustainability practices. Second, we argue that there is need to further engage with the existent literature, beyond the domain of IS research in particular. Generally, engaging with existent theory can help to proceed to more formal theoretical models (Orlikowski 1993). The topic of sustainability spans multiple discipline areas; therefore, economics, sociology, psychology, design, engineering, or other perspectives are likely to further advance our knowledge about how new, IS-based practices can be developed that contribute positively to the emerging global challenges.

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